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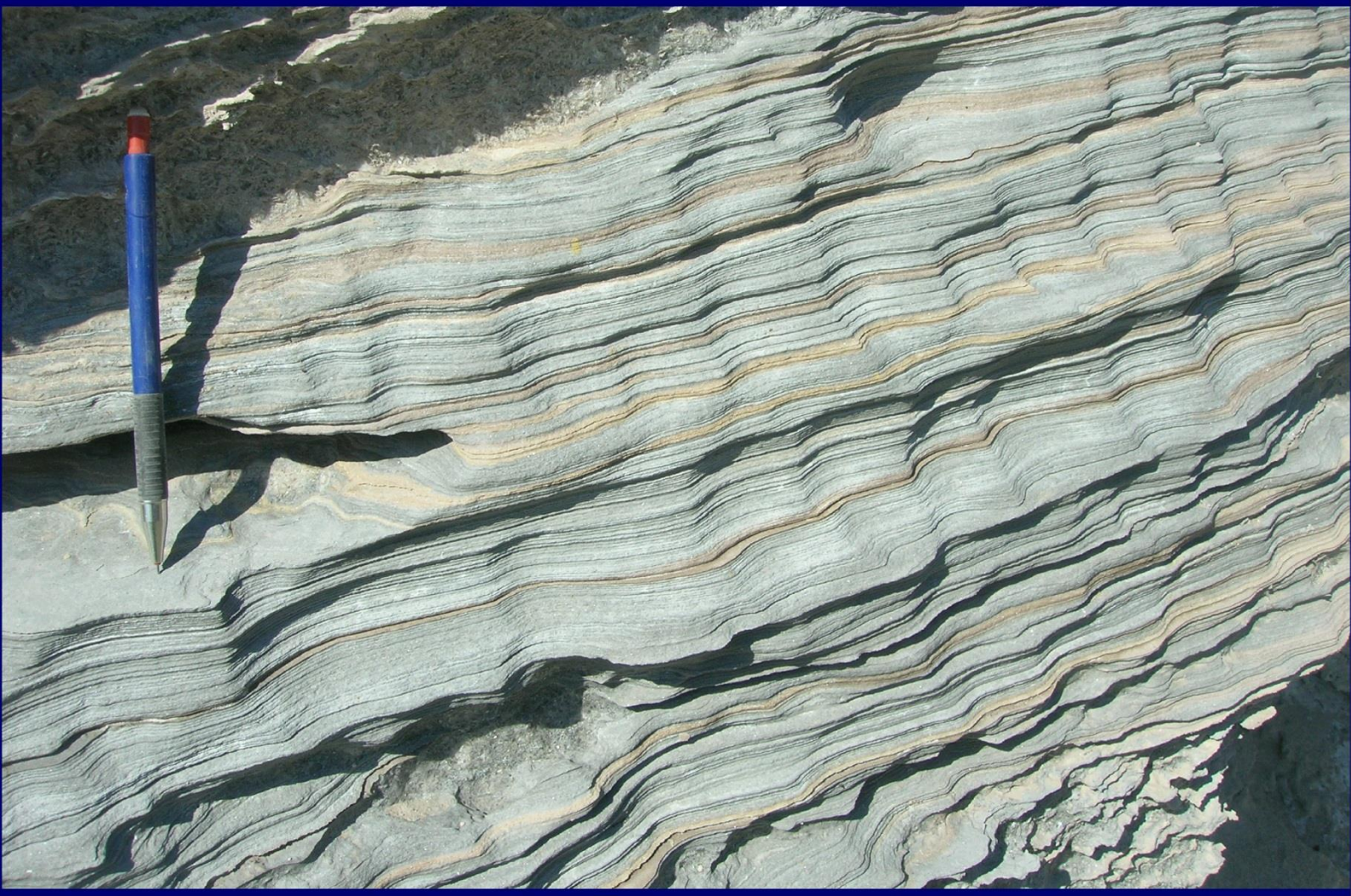
The Messinian salinity crisis: from geology to geobiology



Abstract Book

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(editors)

RCMNS INTERIM COLLOQUIUM

The Messinian salinity crisis: from geology to geobiology

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ABSTRACT BOOK

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Front: Laminated gypsum cropping out in the Pollenzo section, Piedmont, NW Italy (*Photo M. Natalicchio*).

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OXYGEN ISOTOPE SIGNATURE OF THE LATE MIOCENE-PLIOCENE DEPOSITS FROM KALAMAKI SECTION (ZAKYNTHOS ISLAND, GREECE)

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In an attempt to reconstruct the environmental changes at the end of the Messinian Salinity Crisis a multidisciplinary study has been carried out with a high resolution sampling of the Late Miocene - Early Pliocene sediments of Zakynthos Island, Ionian Sea. Results of an integrated biostratigraphic (planktonic foraminifera) and geochemical (oxygen isotopes) study of the Kalamaki section are presented here. In the pre-evaporitic unit of the section, which is composed of hemipelagic clays interbedded with siltstones and gypsum intercalations, several Messinian planktonic bio-events were recognized. Moreover, the detailed distribution pattern of the recognized taxa in the post-evaporitic sequence allowed us to recognize 10 cycles of the "Trubi" carbonate formation at the top of the section.

Reconstruction of paleoenvironmental changes of the Late Miocene-Pliocene succession was performed using qualitative and semi-quantitative estimates from planktonic foraminiferal assemblages and quantitative constraints from oxygen isotope data on *Turborotalita multiloba* (Messinian deposits) and *Globigerinoides ruber* (Pliocene "Trubi" formation). Oxygen isotope compositions are consistent with the most important Late Miocene - Early Pliocene paleoclimatic and paleoceanographic phases in the eastern Mediterranean Sea, yet they present certain differentiations that are owed to local factors. The earliest Pliocene (MPl 1, cycle 1) shows a rapid and progressive increase of the $\delta^{18}O_{G.\ ruber}$ values, which indicates the restoration of marine conditions. Normal marine conditions were established and stabilized near the top of cycle 1.

In addition, the oxygen isotopic data from bulk rock of both the pre- and post-evaporitic sequences reveal several changes; the isotopic values range between -5 to 8‰. Though, since the environmental conditions at this stratigraphic level were perturbed, the interpretation for the $\delta^{18}O_{carb}$ depends a lot from the salinity, the evaporation and the fresh water input. In the pre-evaporitic sequence there are some positive shifts in the O isotopes revealing a "pulse" of higher salinity/evaporation conditions; that are more tense closer to the evaporitic unit. There is also a positive shift in the post-evaporitic, trantisional to "Trubi", sequence which reveals high salinity that is consistent with the underlying gypsum unit.

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